

What is claimed is:

1. A phase shifter comprising:
 - a substrate;
 - 5 a tunable dielectric film having a dielectric constant between 70 to 600, a tuning range of 20 to 60 %, and a loss tangent between 0.008 to 0.03 at K and Ka bands, the tunable dielectric film being positioned on a surface of the substrate;
 - a coplanar waveguide positioned on a surface of the tunable dielectric film opposite the substrate;
 - 10 an input for coupling a radio frequency signal to the coplanar waveguide;
 - an output for receiving the radio frequency signal from the coplanar waveguide;
 - 15 a connection for applying a control voltage to the tunable dielectric film, wherein the connection for applying the control voltage to the tunable dielectric film comprises:
 - a conductive strip;
 - a first electrode position adjacent a first side of said conductive strip to form a first gap between the first electrode and the conductive strip; and
 - 20 a second electrode position adjacent a second side of said conductive strip to form a second gap between the second electrode and the conductive strip; and
 - a conductive dome electrically connected between the first and second electrodes.
- 25 2. The phase shifter according to claim 1, wherein the high dielectric constant voltage tunable dielectric film comprises a barium strontium titanate composite.

3. The phase shifter according to claim 1, further comprising:
 - a first impedance matching section of said coplanar waveguide coupled to said input; and
 - 5 a second impedance matching section of said coplanar waveguide coupled to said output.

4. The phase shifter according to claim 3, wherein the first impedance matching section comprises a first tapered coplanar waveguide section; and
- 10 wherein the second impedance matching section comprises a second tapered coplanar waveguide section.

5. The phase shifter according to claim 1, further comprising:
 - a third electrode position adjacent a first side of said first electrode opposite said conductive strip to form a third gap between the first electrode and the third electrode; and
 - 15 a fourth electrode position adjacent a first side of said second electrode opposite said conductive strip to form a fourth gap between the second electrode and the fourth electrode.

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6. The phase shifter according to claim 1, wherein the substrate comprises one of:

MgO, LaAlO₃, sapphire, Al₂O₃, and a ceramic.

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7. The phase shifter according to claim 1, wherein the substrate has a dielectric constant of less than 25.

8. The phase shifter according to claim 1, wherein the tunable dielectric film has a dielectric constant of greater than 300.

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9. The phase shifter according to claim 1, further comprising:
a conductive housing covering the phase shifter.

10. The phase shifter according to claim 1, wherein the tunable
5 dielectric film comprises one of the group of:

barium strontium titanate ($\text{Ba}_x\text{Sr}_{1-x}\text{TiO}_3$, BSTO, where x is less than 1),
BSTO-MgO, BSTO-MgAl₂O₄, BSTO-CaTiO₃, BSTO-MgTiO₃, BSTO-MgSrZrTiO₆,
and combinations thereof.

10 11. A reflective termination coplanar waveguide phase shifter
comprising:

a substrate;
a tunable dielectric film positioned on a surface of the substrate;
first and second open ended coplanar waveguide lines positioned on a
15 surface of the tunable dielectric film opposite the substrate;
microstrip line positioned on the substrate for coupling a radio
frequency signal to and from the first and second coplanar waveguide lines; and
a connection for applying a control voltage to the tunable dielectric
film.

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12. The reflective termination coplanar waveguide phase shifter
according to claim 11, further comprising:

microstrip divider coupling said microstrip line to said first and second
coplanar waveguide lines.

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13. The reflective termination coplanar waveguide phase shifter
according to claim 11, wherein said first and second coplanar waveguide lines have
different impedances.